

(PROVISIONAL)
INSTRUCTION MANUAL

CEL P164

EFFECTS FRAMESTORE & TBC

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1.0 INTRODUCTION

The P164-38 and P164-18 are each a Digital Effects Framestore Synchroniser and Time Base Corrector. They have facilities for digital manipulation to provide a wide range of visual effects.

Either can be used as a 'Stand-Alone' unit, alternatively the P164-38 may be controlled from a P163 Panel Controller or a P152 'Maurice' Touch Screen Controller. On its own, the front panel can be used to set the picture to various sizes, positions and shapes (except the P164-38XP, which has no controls on the Front Panel); used with an external controller, dynamic control of the functions is possible and sequences of moves and effects can be programmed.

The units work as a synchroniser, and uses the five fields of memory that it has to correct any timing discrepancies between the input picture and the reference signal, thus acting as an 'infinite window' TBC.

The P164 series of units have been designed to the internationally recognised CCIR 601/SMPTE RP125 digital 8-bit standard (often known as '4:2:2', the Y:U:V sampling ratio).

Almost all of the setting-up and adjustment functions can be controlled from the front panel. It is possible to store certain settings, even if the unit's power is switched off.

2.0 GETTING STARTED

Remove the P164-38 from its box and packing.

POWER

Plug in the mains connector (standard IEC-22, supplied); check the mains voltage on the serial number plate before switch-on.

The Front Panel display now shows the initial unit status.

INPUT

Connect a composite video lead from a VTR or other source to the Video 1 Input BNC socket on the rear panel, and terminate the loop-through output with 75 ohms. The LED between the two connectors will light when a video signal is present. If you want to use other types of signal (Y/C S-VHS, YUV Component, U-Matic Dub, etc.) see Section 5, Connections & Installation.

OUTPUT

Connect the Main Output BNC to a video monitor; you will now see the video signal passing through the P164, which is acting as a Time Base Corrector.

EFFECTS

To start seeing the Effects that the unit can provide, look at the Front Panel display. It shows a selection of messages, known as 'menus'; these give access to various functions and other menus using the four buttons below the display.

Initially it will display 'CHOOSE FUNCTION', select as follows:
EFX (3) SIZE (3) ZOOM (3) Use the Spinwheel to adjust size.

Now press the Double Up Arrow button beside the display to return to the 'Top' menu; then select:
EFX (3) WARP (1) PERSP (1) The Spinwheel now adjusts the Perspective function (in one dimension). Touching the other buttons in this menu (SKEW, CREASE & CIRCLE) gives access to more picture manipulation functions. Note that these can be compounded on top of each other to give an almost infinite range of shapes.

To return the picture to normal size, go up a menu to EFFECTS 1 (with the Up Arrow button) and press NORMAL (4).

REFERENCE

To Genlock other video equipment (a vision mixer, for example) to the P164, the Black and Burst output provides a signal of the same timing and phase as the video output.

To Genlock the P164 to other equipment, connect a stable signal (such as Black & Burst from a mixer) to the REFERENCE Input BNC and terminate the loop-through Output with 75 ohms.

EXTERNAL CONTROL

Connect the 'Controller' socket on the Rear Panel either to a P163 or Port 3 of a P152 (or P152A). Note that a special cable (with a yellow connector) is used for this. It is now possible to start operating the effects directly from the controller. Later sections of this manual describe in more detail how the various menus and controls can be operated on the controllers.

3.0 FRONT PANEL OPERATION

When switched on, the P164 has an output picture which is full size, centre screen with no effects added. The front-panel display shows the first of a series of 'Menus', which give access to almost all of the functions of the unit, by means of a series of sub-menus. These functions and menus are selected with the four buttons below the display.

This section is arranged with the menu structure shown first, to indicate how the instructions fit together. After that is a list of all the functions and the 'route' to each of them.

3.1 MENU DISPLAY ARRANGEMENT

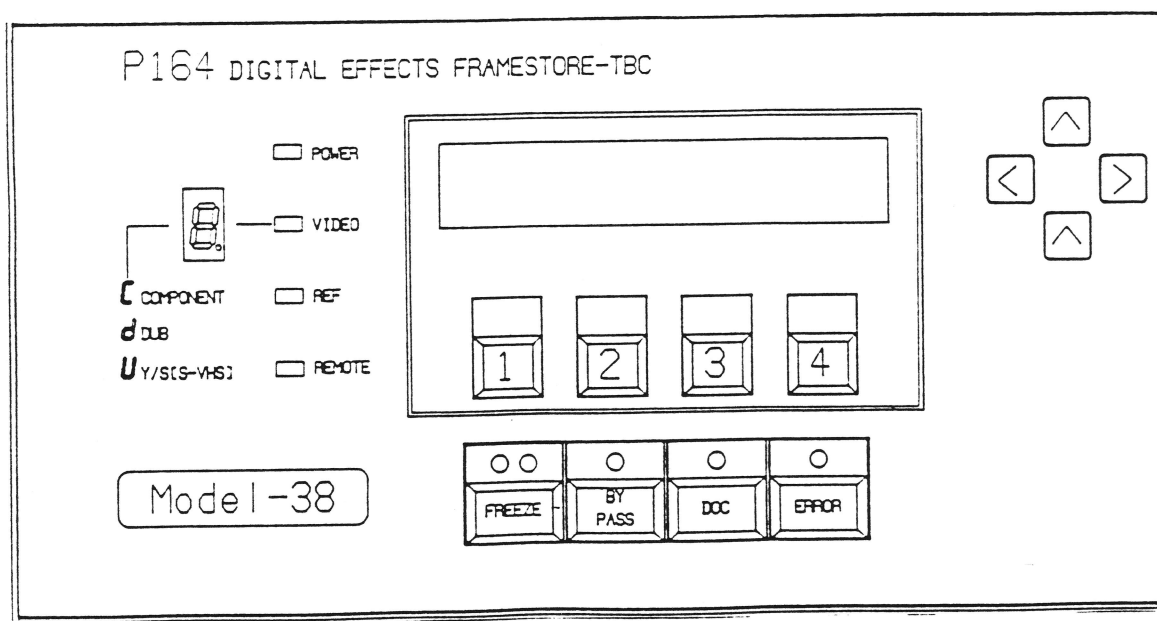
There are three 'Top Level' menus; you can move between them with the Left (<) and Right (>) arrow buttons beside the display. All the sub-menus can be thought of as 'below' these. You can return to the menu 'above' the one displayed with the Up (^) arrow; immediate return to the Top Level is possible with the Double Up Arrow.

Some menu options have more layers than others; for example SETUP has several sub-menus, many of which will only be needed occasionally. Some options are not available on the P164-18, a message is displayed if such an option is selected.

3.2 MENU FUNCTIONS

CHOOSE FUNCTION 1	>	< CHOOSE FUNCTION 2	>	< CHOOSE FUNCTION 3
INPUT SETUP EFX EFX2		BORD FRZ OUT T.PATT		KEY NORMAL

These Top Level Menus give access to the other options (listed below), moving between the Top Level menus is done with the Left and Right arrow buttons (note that this is NOT possible for lower menus). If you get 'lost', press the Double Up arrow button to return to the Top Level.



EFX - Top Level Menu 1, Button 3 (Not P164-18)

E F F E C T S 1			
W A R P	P O S N	S I Z E	N O R M
Warp Sub-menu	P O S I T I O N	S I Z E	Gives Full-
(see below)			size centre
	H-POS V-POS NORMAL	HSIZE VSIZE ZOOM NORM	picture
	Picture Positions on	Picture Sizes on Spin-	(with no
	Spinwheel. Normal is	wheel; Zoom gives both	Warps, etc).
	central Position ONLY	together. 2048 = Normal	Normal Size
		NORM is unity size ONLY	Posn & Shape

Warp sub-menu - Top Level Menu 1, Button 3, Button 1

W A R P
P E R S P S K E W C R E A S E C I R C

| | | |
Gives control of each function on the Spinwheel.
Zero is normal, with control in two directions.

PERSPECTIVE - Maintains middle horizontal size and changes ratio of top horizontal size to the bottom horizontal size.
SKEW - Changes the angle of all the vertical lines in the picture.
CREASE - Leaves the top and bottom horizontal sizes unchanged, and changes the middle horizontal size with linear relationship to top and bottom picture edges.
CIRCLE - Similar to CREASE, but curved to top and bottom edges.

EFX 2 - Top Level Menu 1, Button 4 (Not P164-18)

E F F E C T S 2			
F C I	Q U A N T	P I X	I N V
Selects the	Selects the	Pixellation	I N V E R T S
different False	different levels	size set on	
Colour Imaging	of Quantisation	Spinwheel	H-INV V-INV H-MIR V-MIR
values with the	(or posterisation)		Horizontal and Vertical
Spinwheel.	with the Spinwheel		inversion, H. and V.
			mirror about centre axis

The Pixellation effect uses the Luma level and colour of the centre pixel of the horizontal tile width and the first pixel vertically. Thus an apparent picture shift downwards can result from pixellating the picture.

Border and Background - Top Level Menu 2, Button 1 (Not P164-18)

B O R D E R A N D B . G R O U N D			
S E T	M O D E	C R O P	
Border Setup	B O R D E R M O D E	P I C T U R E C R O P	
Sub-menu			
(see below)	BORD 1 BORD 2 DR.SHAD	H-CROP V-CROP	
	On/Off On/Off on/Off	Crops the Active	
		picture area, so	
		the Border inside	
		edge gets smaller	

B O R D E R S E T U P

DR. SHAD SIZE

H.SIZE	V.SIZE
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
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100	100

H.SIZE	V.SIZE
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5	5
6	6
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11	11
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97	97
98	98
99	99
100	100

ed together with

Saturation (amou

ical sizes are t

behind the picture

F R E E Z E

Only one of the first three can be selected, and the current one flashes when the menu is displayed. BOTH is the Default setting. Whichever option is chosen is the number of Field(s) frozen the 'FREEZE' button on the panel is pressed.

Frame output gives whatever is selected with the Output Control menu (below): this is normally both fields (Frame) and provides better vertical resolution.

Output Control - Top Level Menu 2, Button 3

OUTPUT CONTROL

Selects the mode of output. BOTH is the Default setting, and displays full-frame images (of both fields).

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T E S T P A T T E R N S
1 2 3 4

The buttons turn the Test Patterns on and off, the current one selected flashes. If turned off again, the unit reverts to the previously selected input signal. It is not possible to do any effects on a Test Pattern.

- Test Pattern 1 - Colour Bars (Similar to EBU Bars)
100% White, 75% Colour Saturation
- Test Pattern 2 - Multiburst
50% Grey, 0.5 1.5 2.5 3.58 4.43 5.5MHz
- Test Pattern 3 - Pulse and Bar 20T Pulse (V),
20T Pulse (U), 2T Luma, White Bar, Ramp
- Test Pattern 4 - P164 Specific signal to check U and V;
Zero to Full Range Ramp U and V signals.

Key Control - Top Level Menu 3, Button 1

K E Y I N P U T
ON/OFF VIDEO/TTL DELAY CLIP

- ON/OFF enables the Key Input (Default = Off)
- VIDEO/TTL selects a Video or TTL Key input (where a TTL signal would be from a computer) Default = VIDEO
- DELAY adjusts the start of the Key signal with the Spinwheel
- CLIP adjusts the Key signal Clip or Slice level.

The Key input enables a Key associated with the video input signal to be processed with the video signal throughout the unit. If the Key signal from a caption generator is fed in, then this enables Zooming, Sliding and Warping captions over the Background. The Key O/P signal is a combination of the Key Input and any generated size, warp and movement effects.

Normal - Top Level Menu 3, Button 4

Pressing this button immediately resets the picture size and position, turns off all the warp functions, resets the Input and Black video levels, restores the Crop function so that none of the picture is lost, turns off the Drop Shadow and any Test Patterns that may be selected and puts the output back to full frame.

3.3 MENU FUNCTION LIST

The P164 Front-Panel functions are listed in the order of menus on the display. Sub-menu functions are indented to give an indication of how they are accessed.

MENU AND FUNCTION	TOP LEVEL MENU	BUTTON	ACTION
Inputs Menu	Top Menu 1	1	
Composite Input 1	(1)	1, 1	On/Off
Composite Input 2	(1)	1, 2	On/Off
Composite Input 3	(1)	1, 3	On/Off
Composite Input 4	(1)	1, 4	On/Off
Y/C S-VHS Input	(1)	2, 1	On/Off
U-Matic Dub Input	(1)	2, 4	On/Off
YUV Analogue Input	(1)	3, 1	On/Off
YUV Digital Input	(1)	3, 4	On/Off
Automatic Standard Selection	(1)	4, 2	On/Off
PAL Standard Selection	(1)	4, 3	On/Off
NTSC Standard Selection	(1)	4, 4	On/Off
SECAM Standard Selection	(1)	4, 1, 1	On/Off
NTSC 4.43 Stand. Selection	(1)	4, 1, 3	On/Off
Setup Menu	Top Menu 1	2	
Levels Sub-menu	(1)	2, 1	
Chroma Enhance	(1)	2, 1, 1	On/Off
Luma Input Gain Setting	(1)	2, 1, 2, 1	Spinwheel
Chroma U Input Gain Set	(1)	2, 1, 2, 2	Spinwheel
Chroma V Input Gain Set	(1)	2, 1, 2, 3	Spinwheel
Luma Input Black Setting	(1)	2, 1, 3, 1	Spinwheel
Chroma U Input Black Set	(1)	2, 1, 3, 2	Spinwheel
Chroma V Input Black Set	(1)	2, 1, 3, 3	Spinwheel
Hue Input Control (NTSC)	(1)	2, 1, 4	Spinwheel
Input Delay	(1)	2, 2	Spinwheel
Timing Sub-menu	(1)	2, 3	
Genlock	(1)	2, 3, 1	On/Off
Subcarrier Phase ($\pm 10^\circ$)	(1)	2, 3, 2	Spinwheel
Horizontal Phase	(1)	2, 3, 3	Spinwheel
Y-C Delay Vertical	(1)	2, 3, 4, 2	Spinwheel
Y-C Delay Horizontal	(1)	2, 3, 4, 4	Spinwheel
Display Software Version	(1)	2, 4	Enable
Effects 1 Menu	Top Menu 1	3	
Warp Sub-menu	(1)	3, 1	
Perspective (1-Dimension)	(1)	3, 1, 1	Spinwheel
Skew (Vertical Angles)	(1)	3, 1, 2	Spinwheel
Crease (Straight Line)	(1)	3, 1, 3	Spinwheel
Circle (Curved Line)	(1)	3, 1, 4	Spinwheel
Position Sub-menu	(1)	3, 2	
Horizontal Position	(1)	3, 2, 1	Spinwheel
Vertical Position	(1)	3, 2, 2	Spinwheel
Normal (central) Position	(1)	3, 2, 4	Enable
Size Sub-menu	(1)	3, 3	
Horizontal Size	(1)	3, 3, 1	Spinwheel
Vertical Size	(1)	3, 3, 2	Spinwheel
Zoom (H and V Size)	(1)	3, 3, 3	Spinwheel
Normal Size	(1)	3, 3, 4	Enable
Normal Size, Position, Warps	(1)	3, 4	Enable

MENU AND FUNCTION	TOP LEVEL MENU	BUTTON	ACTION
Effects 2 Menu	Top Menu 1	4	
False Colour Imaging (FCI)	(1)	4, 1	Spinwheel
Quantisation (Posterisation)	(1)	4, 2	Spinwheel
Pixellation	(1)	4, 3	Spinwheel
Inversion Sub-menu	(1)	4, 4	
Horizontal Inversion	(1)	4, 4, 1	On/Off
Vertical Inversion	(1)	4, 4, 2	On/Off
Horizontal Mirror	(1)	4, 4, 3	On/Off
Horizontal Mirror	(1)	4, 4, 4	On/Off
Border & Background Menu	Top Menu 2	1	
Border Set-Up Sub-menu	(2)	1, 1	
Border 1 Set-up Sub-menu	(2)	1, 1, 1	
Border 1 Size (Width)	(2)	1, 1, 1, 1	Spinwheel
Border 1 Luminance	(2)	1, 1, 1, 2	Spinwheel
Border 1 Hue (Colour)	(2)	1, 1, 1, 3	Spinwheel
Border 1 Saturation	(2)	1, 1, 1, 4	Spinwheel
Border 2 Set-up Sub-menu	(2)	1, 1, 2	
Border 2 Size (Width)	(2)	1, 1, 2, 1	Spinwheel
Border 2 Luminance	(2)	1, 1, 2, 2	Spinwheel
Border 2 Hue (Colour)	(2)	1, 1, 2, 3	Spinwheel
Border 2 Saturation	(2)	1, 1, 2, 4	Spinwheel
Drop Shadow Set-up Sub-menu	(2)	1, 1, 3	
Drop Shadow Horiz Size	(2)	1, 1, 3, 1, 1	S.wheel
Drop Shadow Vert. Size	(2)	1, 1, 3, 1, 1	S.wheel
Drop Shadow Luminance	(2)	1, 1, 3, 2	Spinwheel
Drop Shadow Hue (Colour)	(2)	1, 1, 3, 3	Spinwheel
Drop Shadow Saturation	(2)	1, 1, 3, 4	Spinwheel
Background Set-up Sub-menu	(2)	1, 1, 4	
Background Luminance	(2)	1, 1, 4, 2	Spinwheel
Background Hue (Colour)	(2)	1, 1, 4, 3	Spinwheel
Background Saturation	(2)	1, 1, 4, 4	Spinwheel
Border Mode Sub-menu	(2)	1, 2	
Border 1 (Outside)	(2)	1, 2, 1	On/Off
Border 2 (Inside)	(2)	1, 2, 2	On/Off
Drop Shadow	(2)	1, 2, 3	On/Off
Crop Sub-menu	(2)	1, 4	
Horizontal Crop	(2)	1, 4, 1	Spinwheel
Vertical Crop	(2)	1, 4, 2	Spinwheel
Freeze Menu	Top Menu 2	2	
Enable Freeze Field 1	(2)	2, 1	On/Off
Enable Freeze Field 2	(2)	2, 2	On/Off
Enable Freeze Frame	(2)	2, 3	On/Off
Output Field/Frame on Freeze	(2)	2, 4	Select
Output Control Menu	Top Menu 2	3	
Output Field 1	(2)	3, 1	On/Off
Output Field 2	(2)	3, 2	On/Off
Output Both Fields	(2)	3, 3	On/Off
Test Pattern Menu	Top Menu 2	4	On/Off
Test Patt.1 (Colour bars)	(2)	4, 1	On/Off
Test Patt.2 (Multiburst)	(2)	4, 2	On/Off
Test Patt.1 (Pulse and Bar)	(2)	4, 3	On/Off
Test Patt.1 (Y, U, V Test)	(2)	4, 4	On/Off

MENU AND FUNCTION	TOP LEVEL MENU	BUTTON	ACTION
Key Control Menu	Top Menu 3	1	
Key Enable	(3)	1, 1	On/Off
Video or TTL Key input	(3)	1, 2	Select
Key Delay	(3)	1, 3	Spinwheel
Key Clip (or Slice) level	(3)	1, 4	Spinwheel

Normal Size, Position, Warps, Effects, Etc.	Top Menu 3	4
--	------------	---

3.3 FRONT PANEL SWITCHES AND INDICATORS

Switches:

- BYPASS - Switches Video 1 input directly to the main video output; displays 'b' on LED indicator.
- FREEZE - Sends Freeze command, as set in Display Freeze menu.
- D.O.C. - Not yet implemented
- ERROR - Not yet implemented

Indicators:

- POWER - Indicates if the Main Frame Store is powered and functioning.
- VIDEO - Indicates if the Input selected has a video source.
- REF. - Indicates if video is present on the Reference input
- REMOTE - Indicates if a Programmed Sequence is being run from an external controller.

4.0 REMOTE CONTROL OPERATION WITH P152

The P164-38 can be operated from a P152 Touch-Screen Controller. All the front-panel functions are available, as well as being able to have dynamic control with the T-Bars, etc. It is also possible to program and run sequences of moves and effects.

Operation is controlled from a series of 'Menus' which appear on the Touch-Screen. Each one offers far more options than can be shown on the small P164 Front Panel menu display. Touching one of the buttons enables the function named in it.

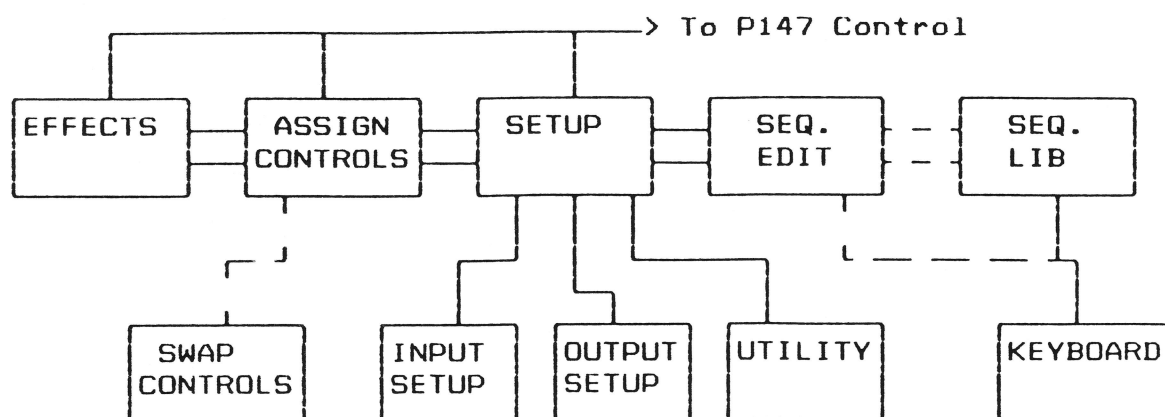
P152 MENU ARRANGEMENT

The following menu descriptions are of Software Version M50-0; this is an early version of the software, and further developments and additional functions are expected. Thus the information must be regarded as Provisional.

The menus are arranged as follows:

- EFFECTS Control of Pre-programmed moves and User-programmed Sequences, plus Horizontal and Vertical Mirrors and Inversions.
- ASSIGN Enables the user to Assign all the different controls on the P152 to various functions. The three Preset Pots are assigned together to groups of functions.
- CONTROLS
- SETUP The Background, Borders and Drop Shadow colours and sizes can be pre-set and turned on and off, as well as level and state of the Input Key. The different video inputs & internal Test Patterns can be selected
- INPUT (Sub-Menu) This is accessed from the Setup Menu.
- SETUP Enables setting of the Input Video and Black levels, the Y/C Delays, Timing, Hue and Dropout levels. Also, switching of Luma AGC, Chroma Enhance, Dropout Compensator and Input Standard selection.
- OUTPUT (Sub-Menu) This is accessed from the Setup Menu.
- SETUP Sets the Phase with respect to the Reference signal. Genlock and Advanced Sync can be turned on and off.
- SEQUENCE Allows creation and editing of the Sequence currently selected in the Effects Menu.
- EDIT
- SEQUENCE For 'Loading' previously programmed Sequences from the disc to be run and 'Saving' Sequences onto disc. At the time of writing this menu is not yet included in the Software Disc.
- LIBRARY

All the menus can be accessed from every other menu, except the sub-menus, which can only be reached from their 'parent' menu.



Each menu has its own 'HELP' page, which gives a brief description of the functions of the buttons in that menu.

4.1 EFFECTS MENU

This menu gives control over running the Pre-programmed Moves, in addition to selection and running of the User-Programmed Sequences of moves and effects. The Mirror and Invert functions can also be turned on and off.

JOY POSN ON/OFF Enables the Joystick to control the position of the centre of the picture.

H MIRROR Gives a reflection of the top half of the picture in the bottom section of the screen. The mirror-line cannot be moved.

V MIRROR Gives a reflection of the left-hand half of the picture in the right-hand section of the screen.

H INVERT Inverts (gives a complete mirror-image) the whole picture left to right.

V INVERT Inverts (gives a complete mirror-image) the whole picture top to bottom (upside-down).

L R U D These buttons act as 'Arrows', and move the picture according to the setting of the 'ZOOM, SLIDE, FOLD' buttons and the 'MOVE IN / MOVE OUT' indicator. When Moving Out, the picture goes from its current size, shape and position to pre-set sizes (see below) with a speed of the current Sequence Time. If Moving In, it moves from the pre-set sizes to full-screen Normal. The state of the Borders and Drop Shadow is not affected. The Move can be repeated with the Green and Red Take Switches (see below).

C (Centre) Always Zooms the picture down to zero size, centre screen; zooms up to full-size Normal.

ZOOM One of ZOOM, SLIDE or FOLD is always On. ZOOM sets the default sizes and positions that the picture moves to and from with the Left, Right, Up and Down direction buttons as zero size at the mid-point of each edge of the picture.

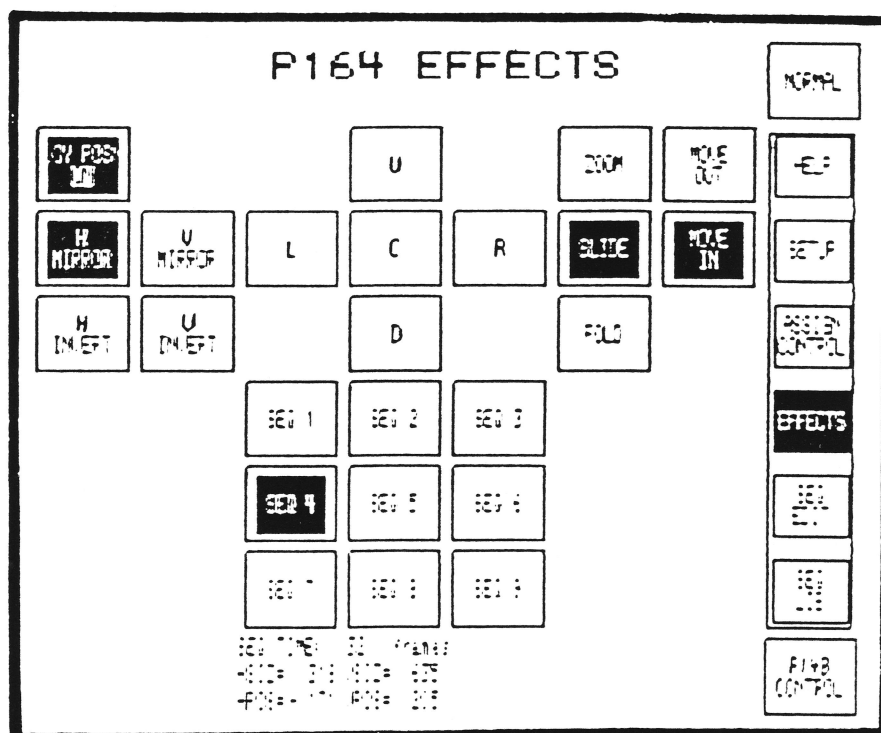
SLIDE Sets the default size/position for use with the direction buttons as Full Size, adjacent to each edge of the picture.

FOLD Sets the default size/position for use with the direction buttons as full width, zero height along the top and bottom edges of the picture, and zero width, full height along the left and right edges.

MOVE OUT Sets the direction of move to be from the Current picture size, shape and position to the Default settings (as defined above).

MOVE IN Sets the direction of move to be from the Default settings (as defined above) to full-size Normal.

SEQ 1 - 9 These buttons run the defined Sequence when touched, from its start point to its end point. The last selected one remains lit. Each one can be programmed using the SEQUENCE EDIT menu.



NORMAL This button has three functions.
When first touched, the picture reverts to full-size, centre screen; any Borders, etc., are left on, while video levels and other set parameters are unchanged. If touched and held on until the second 'Click', the picture reverts to the user-defined pre-set state stored in the UTILITY menu (accessed from SETUP); this could have different input levels, Chroma/Luma delay settings, or Video Input, etc. If held down until the third 'Click' the picture reverts to the factory pre-set parameters.

These same functions also apply in other menus where the button is displayed.

TAKE
SWITCHES When the Green (Go) switch is pressed, the last Move or Sequence is run. If pressed at the end, it runs again. If the Red Switch is pressed at the end, then pressing the Green Switch will make the Move or Sequence run backwards. The Red Switch 'Pauses' the movement, which may be re-started with Green.

Also applies for running Sequences and Moves from other menus.

4.2 ASSIGN CONTROLS MENU

This menu is used to Assign the various controls of the P152 to different functions. Once assigned, controls will continue to have the same function, even if different menus are accessed.

The Left-Hand column is a list of groups of functions that can be assigned to the three Presets to the left of the touch-screen. Move up and down the list with the Up and Down arrows, and to make the assignment touch 'ASSIGN PRESETS'.

KEY Sets Preset pot 1 to KEY CLIP (or Slice) level, and pot 2 to KEY DELAY (to compensate for relative delays in the video paths).

BRD SIZE Preset 1 = Border 1 size (outside border)
Preset 2 = Border 2 size (inside border)

FCI/QUANT Preset 1 = False Colour Imaging. A range of colours which replace the picture's Luma information.
Preset 2 = Quantisation This effect is sometimes referred to as Solarisation or Posterisation. It limits the number of bits of digital information used in the output picture. This give an apparent banding of contrast levels.

PIX Preset 1 = Horizontal Pixellation
Preset 2 = Vertical Pixellation
Preset 3 = Blinds. This effect is used when sliding the picture left and right, and takes different width bands of the picture and alternate bands in opposite directions.

DS POS Preset 1 = Drop Shadow Horizontal position
 Preset 2 = Drop Shadow Vertical position. Note
 that the Drop Shadow can only be below the active
 picture position.

CROP Preset 1 = Horizontal Crop
 Preset 2 = Vertical Crop These functions Crop
 the active picture area, enabling head switching
 noise or wide blanking to be cut off. If the picture
 is cropped, the inside border (Border 2) comes into
 the active picture area.

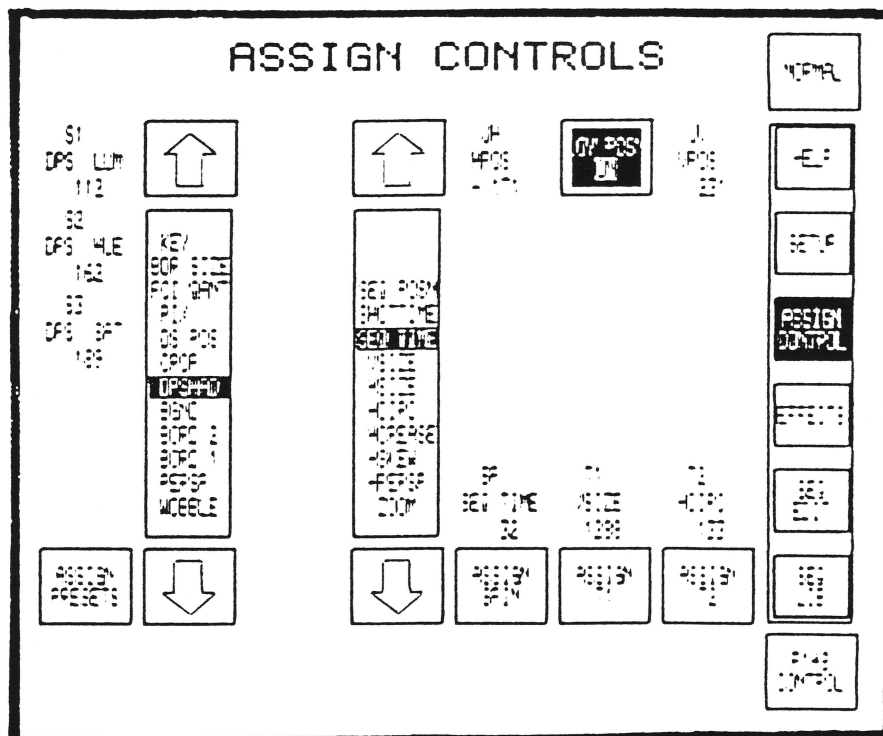
DP SHAD Preset 1 = Drop Shadow Luminance Level
 Preset 2 = Drop Shadow Hue (or Colour)
 Preset 3 = Drop Shadow Saturation

B.GND Preset 1 = Background Luminance Level
 Preset 2 = Background Hue (or Colour)
 Preset 3 = Background Saturation (amount of colour)

BORD 2 Preset 1 = Border 2 Luminance Level
 Preset 2 = Border 2 Hue (or Colour)
 Preset 3 = Border 2 Saturation (amount of colour)

BORD 1 Preset 1 = Border 1 Luminance Level
 Preset 2 = Border 1 Hue (or Colour)
 Preset 3 = Border 1 Saturation (amount of colour)

WOBBLE Preset 1 = WOBBLE F Frequency of the Horizontal
 Wobble function, which causes the vertical lines of a
 picture to become wavy. Increasing F = more waves.
 Preset 2 = WOBBLE A Amplitude of the Wobble
 function, giving bigger waves.



WARPS Preset 1 = Horizontal Perspective. This maintains the middle horizontal size, and changes the ratio of the top to bottom horizontal sizes. Thus a One-Dimensional Perspective effect is obtained.
 Preset 2 = Horizontal Skew. Changes the angle of all the vertical lines in the picture, leaving horizontals unaffected.
 Preset 3 = Horizontal Crease. This maintains the horizontal size of the top and bottom of the picture, and changes the middle horizontal size (to put a 'Crease' in the picture). The middle joins to the top and bottom in a straight-line relationship.

OFF Turns off all the Presets.

The Right-Hand column is a list of functions that can be assigned to the two T-Bars (or Wipe-Arms) to the right of the touch-screen, or to the Spinwheel (on the left). Move up and down the list with the Up and Down arrows, and to make the assignment touch 'ASSIGN SPIN', 'ASSIGN T1' or 'ASSIGN T2'. To turn a control off, assign it again to the same function (by touching the ASSIGN button twice).

ZOOM Increases and decreases the relative picture size, normally up to a maximum of x2 and a minimum of Zero.

SEQ POSN Makes the control move through the programmed positions of a Sequence.

SEQ TIME Sets the time of a whole Sequence or Move, or the time of one shot of a sequence when programming it.

V SIZE Sets The Vertical Size

H Size Sets the Horizontal Size

H CIRC This function is similar to H CREASE (above), but with a curved function between the middle horizontal size and the top and bottom sizes.

H CREASE

H SKEW Identical to the functions (above) on the Presets.

H PERSP

JOY POSN ON/OFF Enables the position of the centre of the picture to be controlled with the Joystick.

4.3 SETUP MENU

This menu is used for setting-up and switching on and off various functions, as well as selecting different video inputs.

BACKGROUND, BORDERS AND DROP SHADOW

The Background, Borders and Drop Shadow colours and the sizes of the Borders and Drop Shadows can be set.

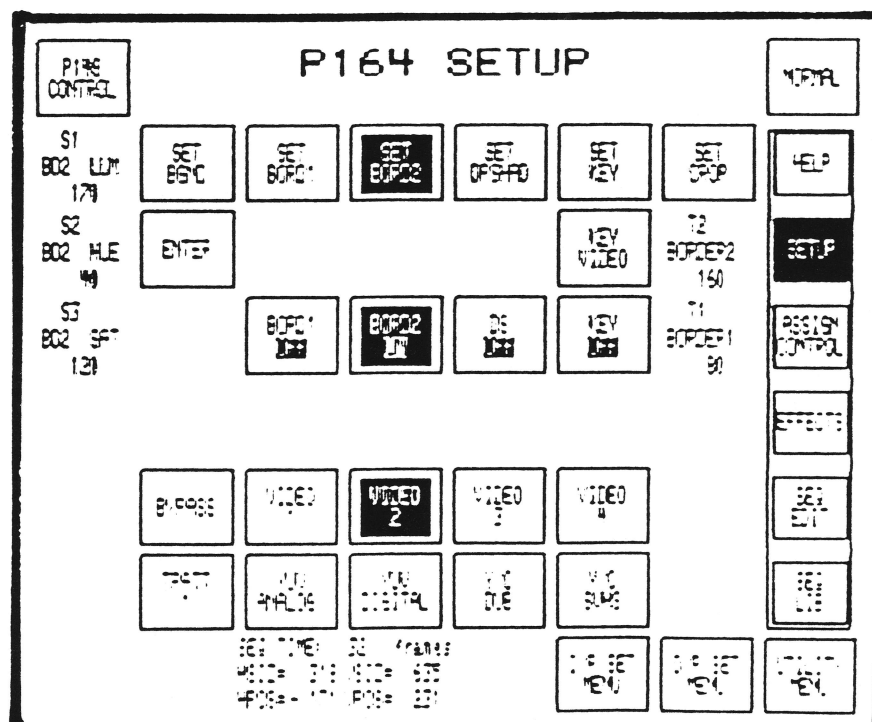
While this is being done, the controls become active to the new functions, and the LEDs beside them flash. The Preset Pots set the Luminance, Hue and Saturation; the size for Borders is set with T-Bar T1, and for Drop Shadow with T1 and T2. When ENTER is touched to enable the new set-up values, the controls revert to the functions that they had before; also the Border or Drop Shadow is left 'On'.

INPUT KEY AND CROP

The Input Key and Crop functions are set in the same way as in the ASSIGN menu, also the Key can be selected as Video or TTL level and turned On and Off.

The Input Key allows only part of the input video picture to be selected for manipulation, with a signal from a caption camera or the Key (or 'Edge') output of a graphics generator. This enables irregular or circular shapes to be used, avoiding the very 'Rectangular' look of some effects. The Key Signal is processed with the video signal, and must be genlocked to it. The Output Key signal will be a combination of the Input Key with the picture manipulations.

The Crop control cuts off the edges of the picture, to manipulate only a reduced rectangular part of the video signal.



VIDEO INPUTS AND TEST PATTERNS

The eight possible video inputs can be selected (note that not all of them can be connected at the same time - see Section 5, Connections and Installation).

BYPASS connects Video 1 input directly to the Main Video Output. The signal is not processed by the unit at all.] NOT FUNCTIONING

The four Test Patterns can also be selected:

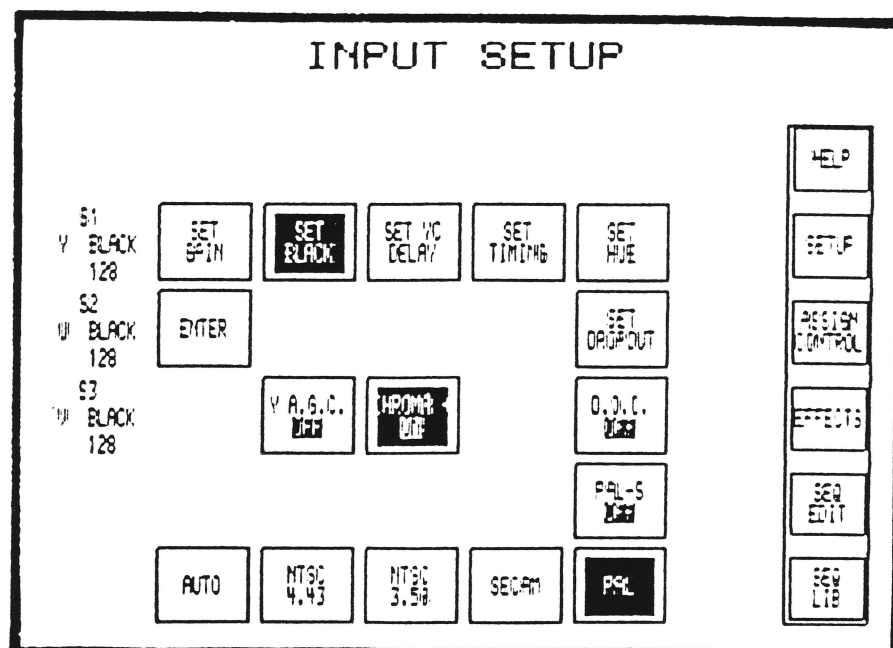
- Test Pattern 1 - Colour Bars (Similar to EBU Bars)
100% White, 75% Colour Saturation
- Test Pattern 2 - Multiburst
50% Grey, 0.5 1.5 2.5 3.58 4.43 5.5MHz
- Test Pattern 3 - Pulse and Bar 20T Pulse (V),
20T Pulse (U), 2T Luma, White Bar, Ramp
- Test Pattern 4 - P164 Specific signal to check U and V;
Zero to Full Range Ramp U and V signals.

There is also access to the sub-menus INPUT SETUP, OUTPUT SETUP and UTILITY.

4.3.1 INPUT SETUP MENU

This enables the setting of the following with the Presets:

- INPUT GAIN - Y, U, V Levels
- BLACK GAIN - Y, U, V Levels For fine adjustment of the Input Black level.
- Y C DELAY - Horizontal and Vertical Luma/Chroma delay.
Advances the Chroma signal to compensate for mis-adjusted VTRs (horizontal, in 74ns Pixels) or multiple PAL decoding (vertical, in lines).



INPUT TIMING - Horizontal and Vertical timing of input pictures into the store, to compensate for wide blanking or differently timed signals.

HUE - $\pm 30^\circ$ control of Input Hue (NTSC only)

DROPOUT - Sets the Dropout threshold level, when using the Drop Out Compensator. This repeats any missing lines which have been corrupted by drop-outs on the tape.

Other functions can be turned On and Off:

Y A.G.C. - Enables the Luma Automatic Gain Control. to give correct Sync amplitude (0.3V).

CHROMA + - Enables the Chroma Edge Enhancement (to sharpen the edges of colours).

D. O. C. - Turns on the Drop Out Compensator function.

STANDARDS SELECTION

Automatic selection allows the unit to determine which standard is presented to its inputs, or it may be 'forced' to one of:

NTSC 4.43 MHz NTSC 3.58 MHz SECAM or PAL

4.3.2 OUTPUT SETUP MENU

GENLOCK

Genlock can be turned on or off, to enable the unit to 'Slave' to an external Black and Burst signal (from a Sync Pulse Generator, etc.) fed into the Reference Input on the rear panel, or to self-run from its own internal SPG.

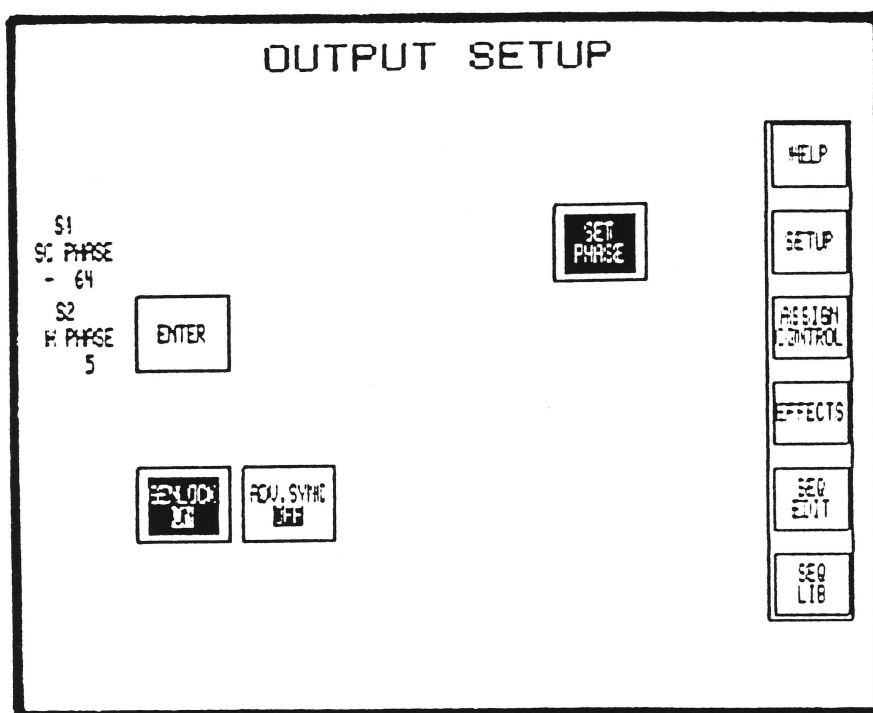
ADVANCED SYNC

The Advanced Sync signal can be turned on or off (advanced or of the same timing as the Reference/Output signal).

OUTPUT PHASE

Subcarrier Phase - $\pm 10^\circ$ adjustment (full adjustment is inside the unit on the Encoder card (ENC) near the bottom, see Section 5.1).

Horizontal Phase - Moves the output picture left and right $\pm 4\mu\text{s}$ with respect to the Reference signal.



4.3.3 UTILITIES MENU

This displays a number of the parameters used in the P164, for diagnostic purposes. In addition there are the System Reset and Store Status functions.

SYSTEM RESET - Re-loads the P152 software from disc and resets the P164 C.P.U.

STORE STATUS - Stores the current status of the P164 into memory. This includes the Video Input levels, the Delays, Borders, Picture Size, selected input, etc.

This can be set up according to a particular VTR, or even particular section of tape. Return to this Status is by touching NORMAL and holding it down until the second 'Click'.

4.4 SEQUENCE EDIT MENU

This menu is used to create and edit Sequences, as selected in the Effects menu. Each Shot (or Keyframe) can be set up and 'saved' in turn as part of the Sequence. Shots can be inserted into the middle of a Sequence, replaced or deleted.

The moves in a Sequence can be set to be Linear or Curved. Curved moves make a 'Best Fit' curve through four points, which are the two end points of that move, the shot before and the shot after. However, the picture always passes exactly through every shot.

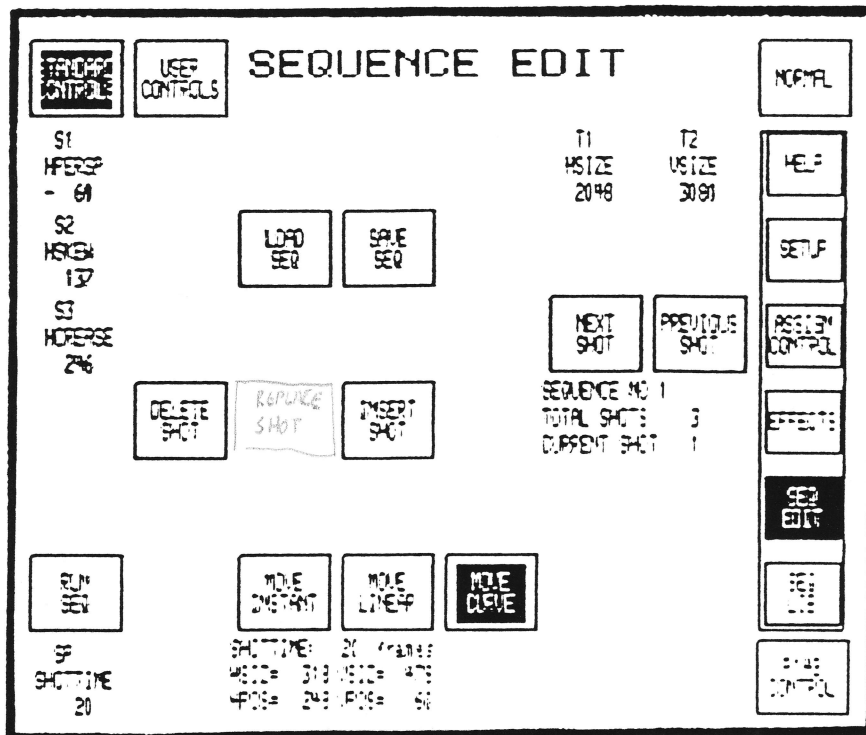
The controls can be set to a 'Standard' configuration, which is an alternative to any made in the ASSIGN CONTROLS menu; return to the previous configuration is with the 'USER CONTROLS' button, or by going to another menu. It is possible to exit to other menus and return to the original shot selected.

INSERT Inserts the Picture size, shape, position and all the
SHOT attributes of the picture that have been set up,
 after the Current Shot. The time for the shot is the
 current Shot Time (displayed at the bottom of the
 menu). For a new Sequence, this becomes Shot 1. If
 inserting a shot in the middle of a sequence,
 subsequent shots are re-numbered.

REPLACE SHOT	Replaces the Current Shot with the new picture status that has been set up, including the time.
-----------------	---

DELETE SHOT	Removes the Current Shot. Any subsequent shots are re-numbered.
----------------	---

RUN	Runs the current Sequence, from its Start to its End.
SEQ	This can be repeated with the Green Take Switch.



STAND CONT Assigns all the controls to a Standard configuration, as follows: PRESETS - Perspective, Skew, Crease
T-BARS - Horizontal & Vertical Size
SPINWHEEL - Shot Time (in frames)
These temporarily over-write any made with the ASSIGN CONTROLS menu.

USER CONT Resets the controls to their previous settings (as made in the ASSIGN CONTROLS menu.

NEXT SHOT Steps forwards through the Sequence to the end one shot at a time.

PREV SHOT Steps backwards through the Sequence to the beginning one shot at a time.

MOVE INSTANT Sets the Movetime for the Current shot to zero. This is useful if changing the status of a function (Border On/Off, Video Input select, etc.) between two shots. Otherwise, the time for each shot is set in fields, using the Spinwheel in Standard Controls.

MOVE LINEAR The movement between each shot in the Sequence will be linear. This applies to all variables which can be controlled in Sequences.

MOVE CURVED The movement between shots will follow a curved path; this will be calculated to give a 'Best Fit' line exactly through every shot, smoothly joining with the curve to the shot before and the shot after the current move. CURVED applies to the whole Sequence.

SAVE SEQ Stores ('Saves') the current Sequence onto the Floppy Disc in the P152, with a name as entered on the keyboard menu which is displayed.

LOAD SEQ Loads a Sequence from the disc into the memory of the P152, such that it becomes the 'Current Sequence'. It may be run from the SEQUENCE EDIT or EFFECTS menus.

DISPLAYS

SEQUENCE NO. (and NAME, if it has been given one) Shows which Sequence of the Nine which can be run from the EFFECTS menu is being edited.

SHOT NO. Indicates the number of the Current Shot.

SHOT TIME Indicates the time (in frames) which the move to the Current Shot will take.

4.5 SEQUENCE LIBRARY MENU (Not yet included in Software)

For 'Loading' previously programmed Sequences from the disc to be run and 'Saving' Sequences onto disc.

5.0 CONNECTIONS AND INSTALLATION

All connections are made to the Rear Panel. See also the diagrams showing suggested methods of connection (Section 5.4).

The Input Video connections are made to the input video BNC sockets. For Dub input from a U-Matic, also connect the video output of the VTR to the VIDEO 2 (DUB C) socket. Note that it is NOT possible to have Dub and Y/C (S-VHS) connected at the same time, as they use the same input circuitry.

Any combination of types of video input to output is possible.

The Serial Lead from a P152 Touch Screen Controller or P163 Panel Controller plugs in to the yellow CONTROLLER connector.

5.1 INPUT CONNECTIONS

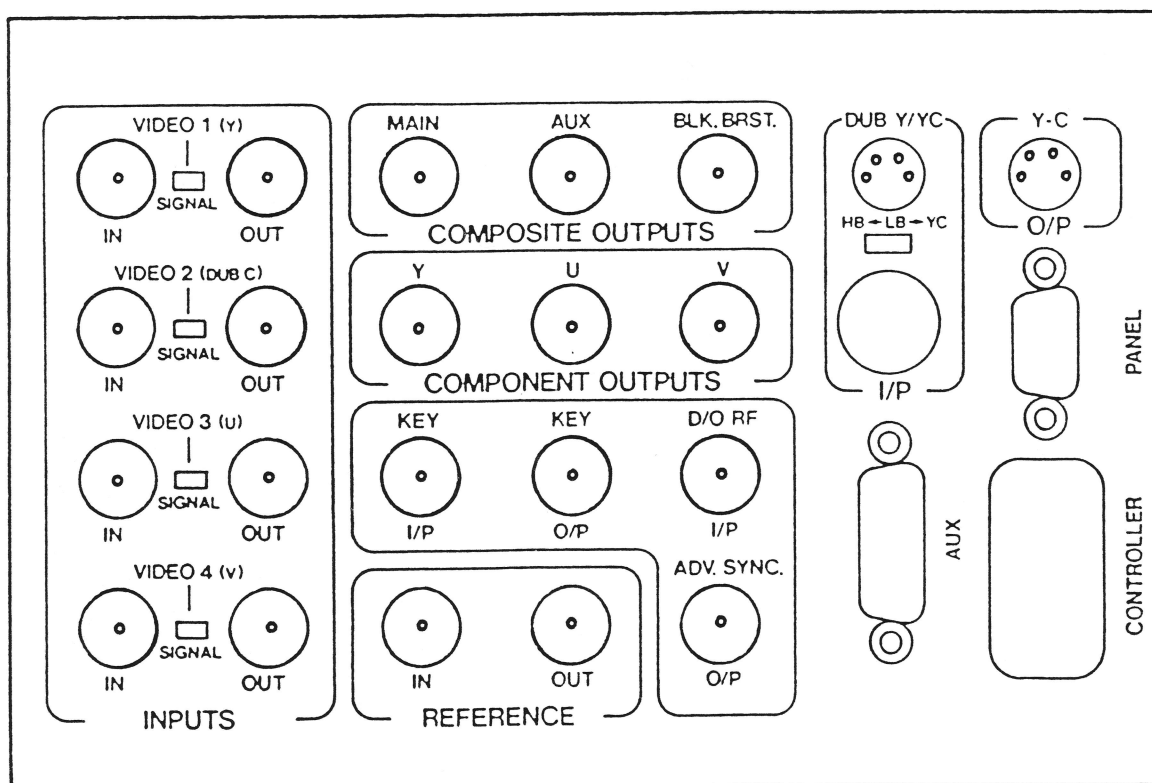
For the different video inputs, the appropriate selection is made from the Front Panel (Top Level Menu 1, Option 1) or using the P164 SETUP menu on the P152 Touch-Screen Controller.

COMPOSITE VIDEO INPUTS

There are four Composite Video inputs, each has a loop-through connector, which should be terminated. There is an LED indicator to show if a signal is present on the input cable.

VIDEO 1 is connected to the Main Output when the BYPASS switch is pressed; it is also the default Input setting, so video signals should normally be connected to this input first.

YUV and DUB signals share some of the Composite connectors, so it is not possible to have all the potential input signals connected at the same time (see below for details).



Y U V INPUTS

Component Video signals are connected as follows:

Luma	Y	-	VIDEO 1
Chroma	U	-	VIDEO 3
Chroma	V	-	VIDEO 4

Each one should be terminated at the loop-through connector.

(Luma - 1V nominal with Sync, U & V - 0.7V nominal, 100%)

If a Composite video signal is required as a switchable option, this should be connected to VIDEO 2.

U-MATIC DUB INPUT

The DUB lead from a 3/4 inch U-Matic is connected to the DUB Y socket. Some early P164s only accept High-Band Dub signals. Later units accept High-Band or Low-Band; whichever type is in use should be selected with the switch beside the connector.

The composite video output of the U-Matic should be connected to VIDEO 2 (and terminated), to provide the chroma information. It is not possible to use S-VHS input or VIDEO 2 composite input if a Dub cable is connected.

S - VHS Y / C INPUT

S-VHS VCRs with a four-pin connector can be linked to the Y-C I/P socket. Those with a seven-pin connector (mostly professional machines) plug in to the DUB Y socket; the switch beside the socket (if fitted) must be set to 'S-VHS', whether a four-pin or seven-pin lead is used.

It is not possible to have the DUB input connected at the same time, because the two sockets share the same input circuitry.

DIGITAL INPUT

On units which have the Digital In/Out option fitted, a standard CCIR 601 signal can be connected to the DIGITAL I/P.

AUXILIARY INPUT

A 15-way D-Type female connector can be used to make virtually all of the connections to one VTR in a single lead (which would need to be made up specially).

The signals on the connector are:		Signal	Ground
Luma (High Band)	Input	Pin 11	Pin 4
Luma (S-VHS Y/C)	Input	Pin 10	Pin 14
Chroma (S-VHS Y/C)	Input	Pin 13	Pin 12
Dynamic Tracking Pulse	Input	Pin 6	Pin 3
D.T. ON Signal	Input	Pin 9	Pin 3
Dropout R.F.	Input	Pin 15	Pin 7
Dropout Pulse (TTL Low)	Input	Pin 5	Pin 3
Advanced Sync	Output	Pin 2	Pin 1

DUB or S-VHS is selected on the Front Panel Input selection or P152 SETUP menu. If DUB is used, the Composite Video output of the VTR needs to be connected to VIDEO 2 to provide the chroma signal.

The Dynamic Tracking Pulse is sent by some sophisticated VTRs to enable fast and slow-motion images without noise bars across the picture. The 'D.T. ON' signal is also sent from the VTR to tell the Frame Store to go into Dynamic Tracking mode.

The Dropout R.F. signal and Dropout Pulse (as sent by some VTRs) indicate when there is a Dropout (or loss of signal) on the tape. The P164 uses this to repeat sections of the previous line to cover the dropout.

An Advanced Sync signal can also be sent to the VTR (see below, 'Outputs').

REFERENCE INPUT

The unit can be Gen-locked with a Black & Burst or Composite Video signal, connected to the REFERENCE IN socket. This must be a stable signal (i.e. NOT off-tape). The loop-through should be terminated.

The unit's Gen-lock is turned on from the Front Panel (Top Level Menu 1, Option 2 (Setup), Option 3 (Timing)), or using a P152 Touch Screen Controller with the OUTPUT SETUP menu (accessed from the SETUP menu). The Video Output will then be locked to the Reference signal, with the colour and horizontal phase relationship to it as set with the phase controls.

The Subcarrier phase can be adjusted by about 10° from the Front Panel or P152. Full 360° control is available with a control inside the unit. To gain access, loosen the six screws holding the Front Panel, and swing it away from the rest of the unit, to reveal an Air Mask. Do not remove the Air Mask. The Subcarrier Phase control is at the bottom, just right of centre. Pass a small screwdriver through the Air Mask hole and adjust the 10-turn pot until the Chroma Phase is correct.

DROP - OUT R.F. INPUT

The R.F. signal off-tape can be used to indicate where a tape drop-out has occurred. A section from the previous line is repeated to cover the missing information.

The Drop-Out Compensation is turned On and Off with the INPUT SETUP menu (accessed from SETUP) on the P152. The threshold of the R.F. signal strength at which Drop Out Compensation starts working is also set in the INPUT SETUP menu.

KEY INPUT

An Input Key signal can be used to select only part of the input video picture for manipulating. It may be a normal Video Key (from a character generator or caption camera) or TTL level (from some computer graphics units). Video or TTL is selected in the SETUP menu on the P152, or from the Front Panel (Top Level Menu 3, Option 4). The signal is positive-going. For Video Key the Clip (or slice) level can also be set.

The Input Key signal is processed with the video signal, and must be exactly synchronous with it. The Key is switched on and off in the SETUP menu or the Front Panel (Top Level Menu 3, Option 4). The Key Delay can be adjusted, to compensate for different delays in the Video and Key signal paths.

5.2 OUTPUT CONNECTIONS

All of the Output sockets have a signal on them at all times, so the P164 can be connected to several different pieces of equipment at the same time. The exception to this is the combination of MAIN Video Output and S-VHS Y-C Output, which should not both be used at the same time.

MAIN VIDEO OUTPUT

This provides a Composite Video output of the processed signal, inserted over the set Background colour. If the BYPASS switch is pressed (or selected from the P152 SETUP menu), VIDEO 1 input is connected directly to the MAIN Output.

AUXILIARY VIDEO OUTPUT

This is a second, identical, feed of the same signal as the MAIN Output (except when the unit is in BYPASS mode).

Y U V COMPONENT OUTPUTS

Separate Y U V signals (of the same picture as the MAIN Output) are provided. This signal has not been encoded into PAL (or NTSC) at any stage after the digital manipulation. Note that if YUV or S-VHS Y-C input is used, the Luma and Chroma signals will never have been combined at any place on the signal path.

Y - C OUTPUT

This four-pin connector gives separate Luma and Chroma signals (of the same picture as the MAIN Output) for use in S-VHS VCRs. The Chroma signal is a filtered feed of the MAIN Composite output (rather than a pure, separately generated signal), so the MAIN Video output should not be connected at the same time, or the Chroma level of both will be affected. If a composite video signal is required as well as Y-C, use the AUX output.

DIGITAL OUTPUT

On units which have the Digital In/Out option fitted, a standard CCIR 601 signal can be obtained from the DIGITAL O/P.

BLACK & BURST OUTPUT

A Black and Burst signal, of exactly the same timing as the MAIN Output is available. If a Reference Input signal is connected and the unit is Gen-locked, this will be a spare source of Black & Burst, in addition to the REF loop-through.

KEY OUTPUT

This is a positive-going TTL signal which is 'ON' wherever the manipulated active video picture is. It enables the output to be keyed over another picture using any video mixer (or switcher) which has a Key input.

The Key signal includes the 'Active Picture' and the Borders. If the Input Key is turned on, the Output Key signal will be a combination of the Input Key with the picture manipulations.

ADVANCED SYNC OUTPUT

This signal can be fed to the Sync (or Video) I/P of VTRs to standardise the timing through units in an Editing System. It can be set to be one field advanced of the MAIN Output (ON) in the P152 OUTPUT SETUP menu, or of the same timing (OFF).

5.3 CONTROL CONNECTIONS

The P152 Touch Screen Controller is connected to the yellow 9-pin CONTROLLER connector. Do not attempt to connect any other lead except the one supplied to this socket.